

GROUP 2 ENGINE

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SECTION 2-A ENGINE SPECIFICATIONS

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2-1 ENGINE TIGHTENING SPECIFICATIONS

Use a reliable torque wrench to tighten the parts listed to prevent straining or distorting the parts or possibly damaging the threads. These specifications are for clean and lubricated threads only. Dry or dirty threads produce increased friction which prevents accurate measurement of tightness. It is important that these torque specifications be strictly observed. Over-tightening to any extent may damage threads, thus preventing proper torque from being attained, requiring replacement or repair of the damaged part.

IMPORTANT: To help prevent thread damage, all bolts used in aluminum must be free

of grit and well lubricated before installation. This note applies in particular to cylinder head and main bearing cap bolts.

“Buick Special Thread Lubricant” is a specially formulated lubricant meeting Buick Specification #1379. This lube, or its equivalent should be used on all bolts (except cylinder head bolts) installed in aluminum. “Buick Special Thread Lubricant” is available through all Buick Parts Warehouses under Gr. 8.800.

Cylinder head attaching bolts must be dipped in “Perfect Seal” sealing compound available through General Motors Parts Warehouses under Group 8.800. “Perfect Seal” sealing compound is a non-hardening lubricant and sealer that prevents seizure of head bolts in the cylinder block due to coolant seepage.

Part	Application	Thread	Torque Ft. Lbs.
Plug	Spark	14mm	15-20 (Lube-engine oil)
Plug	Crankcase drain	18mm	30-35
Bolt	Water pump and timing chain cover to block	5/16-18	20-25
Bolt	Water pump cover to timing chain cover	1/4 -20	6-8
Bolt	Water outlet to intake manifold	5/16-18	20-25
Bolt	Intake manifold gasket clamp to block	5/16-18	10-15
Bolt	Intake manifold to cylinder head	3/8 -16	25-30

2-2 SPECIFICATIONS**ENGINE**

Part	Application	Thread	Torque Ft. Lbs.
Bolt	Exhaust manifold to cylinder head	3/8 - 16	10-15
Bolt	Carburetor to intake manifold	5/16-18	12-15
Bolt	Fuel Pump to timing chain cover	5/16-18	20-25
Bolt	Camshaft sprocket to camshaft	7/16-20	40-45
Bolt	Rocker arm shaft bracket to cylinder head	3/8 - 16	25-30
Screw	Rocker arm cover to cylinder head	1/4 -20	3-5
Bolt	Cranking Motor to cylinder block	3/8 - 16	30-35
Bolt	Distributor clamp to timing chain cover	3/8 - 16	14-17
Bolt	Generator bracket to timing chain cover	3/8 - 16	30-35
Bolt	Generator brace to timing chain cover	3/8 - 16	30-35
Bolt	Generator to mounting bracket	5/16-24	25-35
Bolt	Generator rear end frame to exhaust manifold	5/16-18	14-17
Bolt	Generator brace to generator	5/16-18	14-17
Bolt	Crankshaft bearing cap to crankcase	1/2 -13	50-55
Plug	Cylinder block water drain	1/4 -18 pt	15-20
Bolt	Cylinder head to block	7/16-14	50-55
(Lube-perfect seal)			
Bolt	Upper flywheel housing to cylinder block	3/8 - 16	30-35
Bolt	Lower flywheel housing to block and upper flywheel housing	5/16-18	20-25
Bolt	Flywheel to crankshaft	7/16-20	50-60
Bolt	Harmonic balancer to crankshaft	5/8 - 18	140-160
Nut	Connecting rod bolt	11/32-24	30-35
Bolt	Ignition coil to intake manifold	5/16-18	20-25
Bolt	Oil pan to block	5/16-18	6-15
Bolt	Oil screen housing pipe and flange assembly to block	1/4 -20	10-15
Bolt	Timing chain cover to block	5/16-18	20-25
Cap	Oil pressure relief valve		30-35
Cap	Filter by Pass valve		30-35
Screw	Oil pump cover assembly to timing chain cover	1/4 -20	10-15
Switch	Oil Pressure		8-10
Bolt	Fan and pulley to water pump hub	5/16-24	15-20
Bolt	Pulley and reinforcement to harmonic balancer	5/16-18	15-20
Bolt	Front steering pump bracket to block	5/16-18	20-25
Bolt	Front steering pump bracket to timing chain cover	3/8 - 16	25-35
Bolt	Front steering pump bracket to pump	3/8 - 16	25-35
Bolt	Rear steering pump bracket to cylinder head	3/8 - 16	25-35
Bolt	Front air conditioner compressor brace to cylinder head	3/8 - 16	25-35
Bolt	Front air conditioner compressor brace to front compressor mount bracket	3/8 - 16	25-35
Bolt	Engine mount to cylinder block	7/16-14	50-55
Bolt	Engine mount to frame bracket	7/16-20	55-65
Nut	Battery ground strap to engine cylinder head bolt stud	7/16-20	8-10
Bolt	Intake manifold and transmission idler lever bracket to cylinder head	3/8 - 16	25-30

2-2 ENGINE GENERAL SPECIFICATIONS

Items	
Type - No. of Cylinder	90° V 8
Valve Arrangement	In Head
Bore and Stroke	3.5 X 2.80
Piston Displacement	215 cu. in.
Compression Ratio	8.8 to 1
Brake horsepower at RPM	150 @ 4400
Foot Pounds Torque at RPM	220 @ 2200
Taxable Horsepower	39.2
Cylinder Numbers Front to Rear	
Right bank	2-4-6-8
Left bank	1-3-5-7
Firing Order	1-8-4-3-6-5-7-2
Cylinder block material	Aluminum
Cylinder liners	Non-replaceable cast iron
Engine manifold vacuum at idle	
Crankshaft bearings Number and Type	5 Replaceable liners
Material	Durex 100-A

Items

Bearing which takes end thrust	Center
Connecting rod bearings, type	Replaceable liners
Material	Durex 100-A
Piston material and surface treatment	Aluminum alloy Tin Plated
Compression rings - No. per piston - Material	2 cast iron
Oil rings - No. per piston	One
Type	3 piece
Location of all piston rings	Above piston pin
Camshaft, type and material	Cast iron alloy
Camshaft drive	Chain
Number and type of camshaft bearings	5 steel backed babbit
Valve lifter type	Hydraulic
Valve spring type	Single helical
Oiling system type	Forced feed
Oil supplied to bearing surfaces	
Crankshaft, Camshaft and con rods	Full Pressure
Pistons, Pins	Splash
Cylinder walls	Splash and nozzle
Valve lifters	Full pressure
Rocker arms	Low pressure
Normal oil pressure	33 lbs. at 2400 RPM
Oil Reservoir Capacity - Quarts	4 (5 with dry filter)
Oil Filter, Make and type	AC Type PF-5
Cooling System Type	Pressure (15 lb. radiator cap)
Water temperature control	Thermostat
Thermostat opens at (°F)	167° to 172°
Cooling System Capacity	
Less Heater	12 qts.
With Heater	13.5 qts.
Fan diameter, No. of blades (Regular)	16"-4
Fan diameter, No. of blades (Air conditioning)	17"-6

2-3 ENGINE DIMENSIONS, FITS AND ADJUSTMENTS

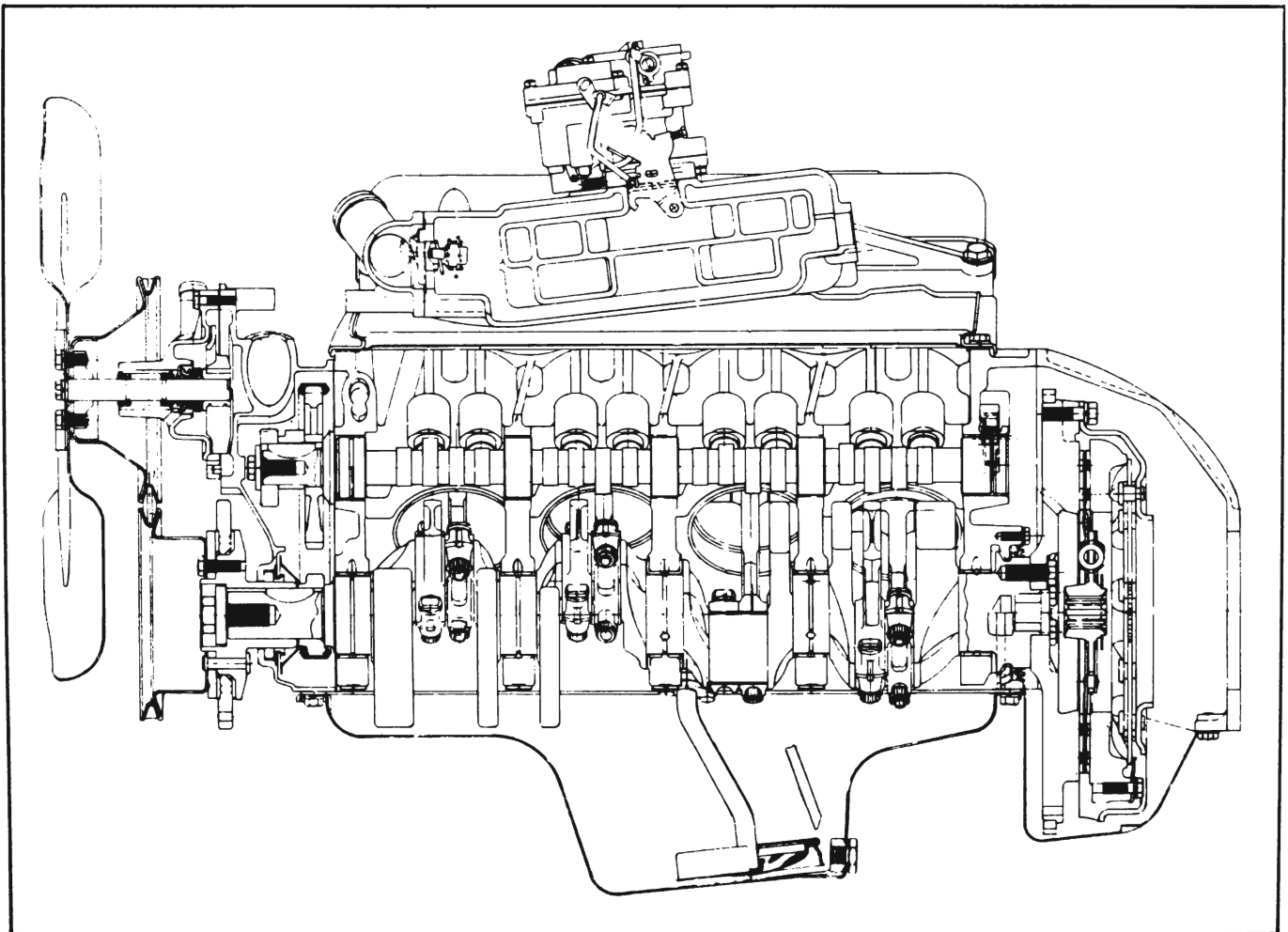
NOTE: These dimensions and limits for fit of parts apply to new parts only. "T" means tight and "L" means loose.

Items

Crankshaft journal diameter	2.2983
Crankshaft journal to bearing clearance	.0005 - .0021
Crankshaft end play at thrust bearing	.004" - .008"
Crankshaft bearing effective length	
#1	.802"
#2	.802"
#3	.965"
#4	.802"
#5	.802"
Crankpin journal diameter	2.000"
Crankpin journal to bearing clearance	.0002" - .0022"
Connecting rod end play on crankpin	.006" - .014" (Total both rods)
Connecting rod bearing length	.737
Piston clearance in bore	.0005" - .0011"
Piston pin diameter	.8747 - .8750
Piston pin length	2.870
Piston pin fit at 70°F in piston	.0001"
Piston pin fit in connecting rod	.0005" - .0013" Press
Piston ring side clearance in groove	
Compression ring	.003" - .005"
Oil ring	.0035" - .0095"
Piston ring gap, compression ring in bore	.010" - .020"
Oil ring in bore	.015" - .035"

Items**Camshaft bearing journal diameter**

#1	1.785" - 1.786"
#2	1.755" - 1.756"
#3	1.725" - 1.726"
#4	1.695" - 1.696"
#5	1.665" - 1.666"
Camshaft journal clearance in bearings	.0005" - .0035"
Valve lifter diameter	.8422" - .8427"
Valve lifter clearance in crankcase	.0015" - .003"
Valve lifter leakdown ratio, in test fixture	12 to 40 sec.
Rocker arm ratio	1.6 to 1
Rocker arm clearance on shaft	.0027" - .0042"
Valve head diameter inlet	1.500"
Valve head diameter exhaust	1.3125"
Valve seat angle Inlet and Exhaust	45°
Valve stem diameter inlet	.3412" top - .3407" bottom
Valve stem diameter exhaust	.3407" top - .3397" bottom
Valve stem clearance in guide	
Inlet	top .0005" - .0025" bottom .0015" - .0035"
Exhaust	top .001" - .003" bottom .002" - .004"
Valve Spring	
Valve closed pounds @ length	55@ 1.640"
Valve open pounds @ length	148@ 1.260"
Fan belt adjustment	See Figure 2-53

**Figure 2-1—Engine Side Sectional View**

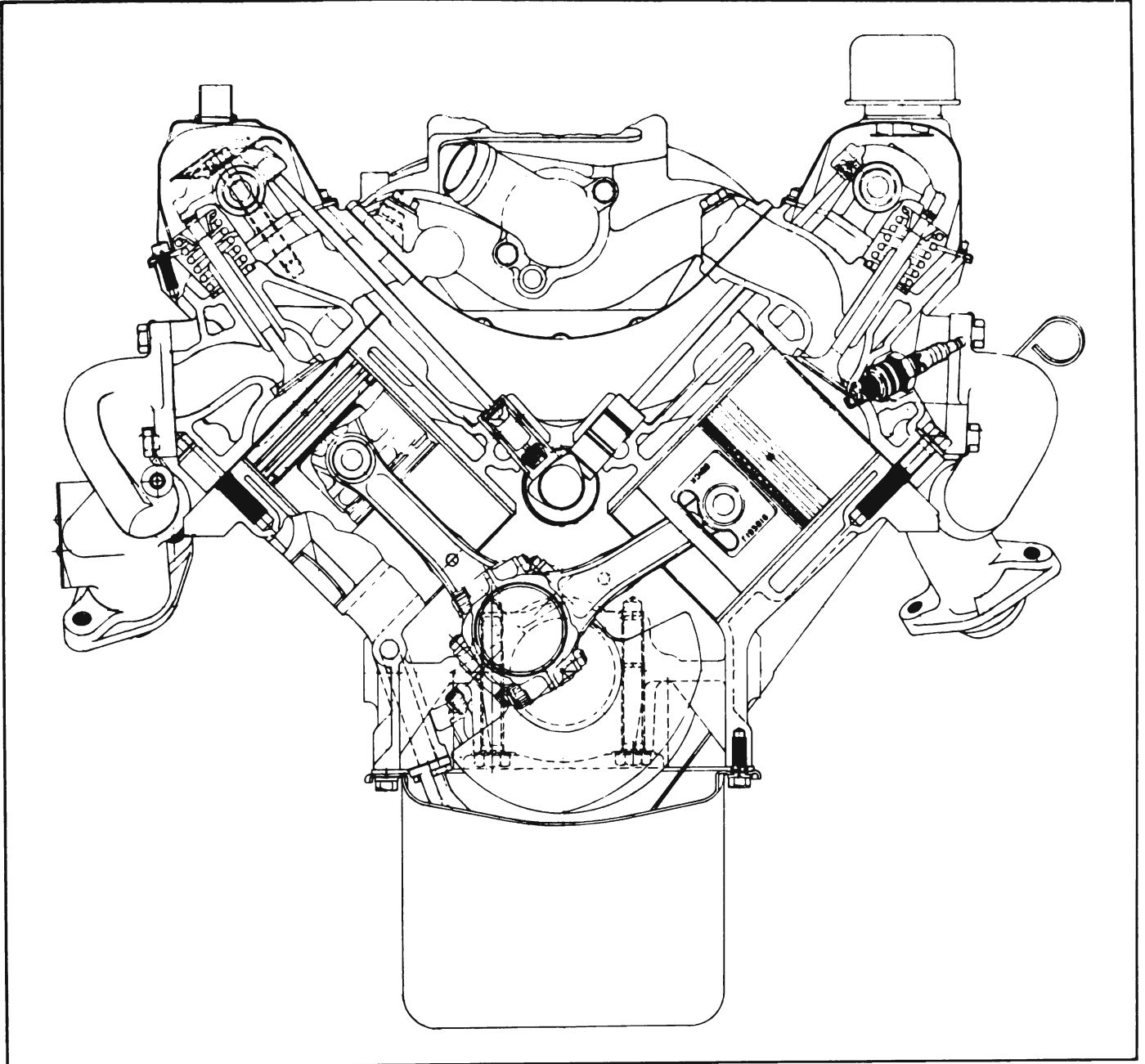


Figure 2-2—Engine End Sectional View